3.0 DESCRIPTION OF THE BACKCOUNTRY/WILDERNESS RESOURCE (Affected Environment)

3.1 Regional Context and General Description

Rocky Mountain National Park (RMNP or the Park) encompasses 265,769.14 acres (107,556 hectares) and is located in north-central Colorado in portions of Larimer, Boulder, and Grand Counties. The towns of Allenspark, Glen Haven, Estes Park, Meeker Park, and Grand Lake are found along its borders. Within RMNP, 95 percent of the land is either designated, recommended, or potential wilderness. The lands bordering RMNP are a mixture of state, local, private, and federal holdings. About 62 percent of the Park boundary borders National Forest land, with 70 percent of the adjacent Forest lands managed as designated wilderness. The rest of the Park boundary borders subdivisions, summer camps, and burgeoning town populations. Figures 1-1, 1-2, and 1-3 (Chapter 1.0) depict the Park's location, wilderness areas, and adjoining wilderness areas.

Rocky Mountain National Park is easily accessible from the Denver metropolitan area, some 65 miles (105 kilometers) to the southeast. Interstates 25, 70 and 76, which converge in Denver, provide rapid access for visitors coming from all regions of the United States. Local highways that provide access to RMNP include State Highways 7, 34, and 36. Because of RMNP's popularity and its proximity to communities along the Colorado Front Range, visitation is exceeding three million annually. Visitation at RMNP is approximately the same as Yellowstone National Park, although RMNP is about one eighth the size of Yellowstone.

3.2 Natural, Cultural and Social Aspects of the Wilderness Resource

3.2.1 Geology, Soils, and Vegetation

Rocky Mountain National Park features an exceptionally scenic portion of the Southern Rocky Mountains that were formed in this area by a series of granitic batholiths intruded into precambrian micashists and pegmatites. Igneous metamorphic rock and glacial till generally characterize the geology of RMNP. Elevations within RMNP range from roughly 8,000 to 14,000 feet (2,440 to 4,270 meters), and nearly one-third of RMNP lies at an elevation of over 11,000 feet (3,355 meters), or in the alpine tundra zone. Precipitation in the form of snow occurs for approximately nine months of the year in the alpine tundra zone, and snow has been known to occur at these elevations during any month.

The Continental Divide bisects RMNP from roughly north to south, and acts as a border between two distinct geologic areas on the east and west sides of the Park. The eastern side of RMNP is characterized by steep cliffs with U-shaped valleys that were altered by episodes of localized pleistocene glaciation. The freeze-thaw cycle is the predominant erosive factor in the shaping of the rocks, and the rough granite, crystalline cracks, and rounded structures make many cliffs popular for technical rock climbing. The eastern slope also lies in a slight rainshadow that receives about 15 inches (38 centimeters) of precipitation annually, and is subject to high Chinook winds throughout the winter. On the western side of the Park, the mountains recede gradually into the Kawuneeche Valley. The western slope receives more precipitation than the eastern side with approximately 20 inches (51 centimeters) of precipitation annually and deeper snows.

An Order 2 soil survey was completed at the lower elevations of RMNP and an Order 3 soil survey was completed for other areas of RMNP in 1998 (NRCS 1999). Most soils in the Park are classified under the cryic soil temperature regime, or soils that have a mean annual temperature higher than 0°C but lower than 8°C (NRCS 1994). According to field data, some soils at high elevations and under spruce-fir forest may meet the requirements of the isofrigid soil temperature regime, or soils that have a mean annual soil temperature that is lower than 8°C. Soils in RMNP tend to be relatively infertile and sandy with poor development of the decomposed parent granitic substrates. Low-lying and swale areas tend to have the best soil development.

Three general soil types exist within RMNP (NRCS 1999):

- **Cryochrepts** are well drained with moderately rapid permeability and slow runoff. This soil type is generally found in the glacial till areas and is deep to very deep. There may be large stones and boulders on the surface and in the profile. The erosion hazard is slight to moderate.

- **Cryoboralfs** are moderately- to well-drained with moderate permeability and moderate runoff. The erosion hazard is moderate.

- **Cryaquepts** are poorly to very poorly drained, with slow to moderate permeability and slow runoff. They are found in wetter, and flatter areas. The erosion hazard is slight unless slopes are denuded of vegetation.

Rocky Mountain National Park is something of a botanical crossroads due to its variations in elevation, soils, and climate, and is comprised of approximately 60% forest, 13% alpine tundra, 18% exposed rock, and 9% mixture of habitats. There are nine distinct floras within RMNP including ponderosa pine, lodgepole pine, spruce/fir, alpine tundra, aspen, riparian/willow, wet meadow, upland shrub/grasses, and high-elevation willow. Of these, the major vegetation types consist of ponderosa pine and grass/shrubland habitat from 7,800 to 8,500 feet (2,380 to 2,600 meters), lodgepole pine from 8,500 to 9,500 feet (2,600 to 2,900 meters), spruce/fir from 9,500 to 11,500 feet (2,900 to 3,500 meters), and alpine tundra over 11,500 feet (3,500 meters). In addition, roughly 18 percent of RMNP is rock. Approximately 1,025 vascular plants have been identified at RMNP.

The Continental Divide that bisects RMNP from north to south acts as a border between two distinct vegetation zones. The eastern side of RMNP features a mixture of dry and wet grasslands, montane forests, lodgepole pine, spruce/fir, and tundra. The western side is more elevated and moist, lacking dry valleys and montane forests, and contains primarily lodgepole pine, with spruce/fir and tundra.

Historic use of RMNP significantly impacted native plant communities and allowed the introduction of noxious weeds. For example, Moraine Park at one time had a nine-hole golf course. The golf course closed in the late 1960s, but today 20 percent of the plant composition in the meadow is exotic plants, several of which are invasive noxious weeds.

3.2.2 Wetlands, Floodplains, and Aquatic Resources

Rocky Mountain National Park is located at the headwaters of four major river basins; the Big Thompson, North Fork of the Colorado, North Fork of the St. Vrain, and the Cache La Poudre

Rivers. The Continental Divide bisects RMNP into two different watersheds, east and west. The North Fork of the Colorado River is located west of the Continental Divide, and the other three river basins are located east of the Continental Divide. Any water flowing west eventually drains into the Colorado River, and water flowing east drains into the Missouri and Mississippi Rivers.

The aquatic ecosystem in RMNP consists of 147 lakes, which contain a surface area about 1,103 acres (450 hectares) and 473 miles (757 kilometers) of stream. Historically, the water quality of the lakes and streams in RMNP has been excellent with only minor degradation due to natural siltation. Today however, visitor use and atmospheric conditions are negatively altering water quality. A number of trails and roads in RMNP lead to lakes or follow along streams, and visitors use is resulting in negative affects to aquatic communities including water quality degradation, riparian vegetation damage, and accelerated streambank erosion. Water quality degradation is most common where campsites and privies are located close to streams. A study conducted in the Park showed that Giardia contamination could be present near beaver ponds or areas of frequent or extensive human activities (NPS 1986). Other water bodies where water quality degradation has occurred include Chasm Lake and Fall River.

Originally, many of the high elevation lakes and streams in RMNP had no fish life. Today however, at least 51 of the lakes in RMNP contain trout populations, due in part to stocking by original settlers or early park managers. Up until 1969, fish stocking was performed only with exotic trout which displaced many of the native species. In the late 1970's, park managers stopped stocking with exotic trout and began to reintroduce native trout.

The aquatic/riparian areas of RMNP exhibit some of the most diverse habitat in the Park for flora and fauna. Populations of beaver exist in the streams and lakes of RMNP, but populations have fluctuated dramatically over time due to exploitation by early explorers, disease, and the draining of riparian habitat by humans. Visitor use is having a negative effect on riparian communities in RMNP, and several noxious weeds are invading these resources due to disturbance caused by visitors and wildlife.

Per Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands), encroachments or modifications of 100-year floodplains and wetlands on NPS-administered lands are to be avoided where practicable. Wetland types that occur in RMNP include alpine willow, riparian bog, riparian meadow, riparian willow, blue spruce, and open water streams.

3.2.3 Wildlife and Threatened, Endangered, and Special Status Species

Rocky Mountain National Park has a great diversity of fauna with 260 species of birds, 66 species of mammals, 11 species of fish, 5 species of amphibians, and one species of reptile. Elk, bighorn sheep, moose, and deer are the large ungulates found within RMNP. The upper montane zone (7,800 to 9,000 feet) forms the primary winter range for deer and elk at RMNP. Moose are found on the west side of RMNP principally in the Kawuneeche Valley. Bighorn sheep, the symbol of RMNP, are particularly sensitive to human disturbances. Other common mammals found at RMNP include the chickaree, coyote, bobcat, mountain lion, chipmunk, and golden-mantled ground squirrel.

With 260 species of birds, RMNP offers a great variety of habitats to support this avian diversity including three major life zones (montane, sub-alpine, and alpine) and plant communities ranging from willow carrs, ponderosa pine, lodgepole pine/spruce-fir forests, and alpine tundra. Some of the highest diversity and density of birds at RMNP are found in aspen and ponderosa pine habitat.

Many songbirds rely on this habitat for nesting. A few of the more common species of birds at RMNP include the American robin, broad-tailed hummingbird, red-tailed hawk, black-billed magpie, Stellar's jay, dark-eyed junco, pine siskin, and mountain chickadee.

The Endangered Species Act requires NPS to identify and manage federally listed threatened or endangered species. NPS at RMNP also manages state-listed threatened or endangered species, species of concern, and species that are sensitive or rare to RMNP. There are 69 endangered, threatened, or rare species known to occur at RMNP including three species of amphibians, 16 species of birds, three species of fish, seven species of mammals, 12 species of invertebrates (insects), one species of mollusk, and 27 species of plants. Appendix A provides a detailed list of the threatened, endangered, and special status species (flora and fauna) at RMNP.

3.2.4 Natural Quiet, Sounds, and Lights

Rocky Mountain National Park contains various tangible natural and cultural features, such as animals, plants, waters, geologic features, and historic buildings. The Park also contains intangible qualities such as natural quiet, solitude, space, light, night sky, and scenery. Both tangible and intangible resources are equally important in management decisions affecting park resources.

In much of RMNP and especially the backcountry, the dominant sounds are of wind, rustling vegetation, and animal calls. The wilderness areas are free of most man-made noises from machinery and motor vehicles. A noise study was completed for RMNP with regards to aircraft overflights, and Section 126 of an Omnibus Bill signed in 1998 permanently banned commercial air tours over RMNP.

Night sky free from light pollution is considered an important resource. With increasing development along the Front Range and other metropolis areas, it has been increasingly difficult to find areas with no artificial lighting at night. The wilderness at RMNP provides the opportunity to view the surrounding scenery in natural light and the night sky with stars, comets, and meteor showers without the interference of artificial lighting.

About 95 percent of RMNP is proposed or designated wilderness, where natural quiet and natural light are considered important resources. The NPS strives to preserve the natural quiet, the natural sounds, and the natural light associated with the physical and biological resources of the Parks. Activities causing excessive or unnecessary unnatural sounds in and adjacent to parks are monitored, and actions are taken to prevent or minimize unnatural sounds that adversely affect park resource or values or visitors' enjoyment of them (NPS 77, 1994).

3.2.5 Air Quality

The Clean Air Act amendment of 1977 recognizes the need to protect visibility and air quality in National Parks. By definition, wilderness areas and National Parks, including RMNP, are mandatory Class I areas, providing for the least amount of development that could potentially affect air quality. Visibility is impaired in RMNP about 90 percent of the time, primarily due to outside sources including Colorado's Front Range, and as far away as Mexico, Texas, Los Angeles, and California. The average summer (June-August) viewing distance from RMNP is 83 miles (111 kilometers), 50 percent of the time. Viewing distances can vary from a high of 120 miles (194 kilometers) on a clear day to a low of 30 miles (49 kilometers) on a high pollution day (RMP 1998).

Increasing development around the park boundary, as well as along the Front Range from Colorado Springs north to Fort Collins, affects air quality at RMNP particularly when winds blow from the northeast, east, and southeast. Recent research indicates that air pollution may be altering soils and native plant composition, which in turn may be promoting the growth of certain annual exotic plants (Stohlgren et.al., 1998). Research also indicates that nitrogen deposition along the Front Range of Colorado, including RMNP, is greater than any other states west of the Mississippi River, except for parts of California (Williams et. al. 1996).

In 1993, RMNP exceeded the National Ambient Air Quality Standard (NAAQS) of .12 parts per million (ppm) for ozone. This was the first exceedance since ozone monitoring began. Ozone can be harmful to humans, wildlife, and particularly damaging to some species of plants at levels above .08 ppm (Peterson and Arbaugh, 1989). Since 1987, ozone levels of .08 ppm and above have occurred at least 130 times. There is a concern that with the development occurring along the Front Range, particularly in the Denver/Boulder area, that more exceedances of ozone could occur.

Research in RMNP at Loch Vale indicates nitrate levels are increasing in the high elevation lakes. This could have a negative affect on native plants and cause an increase in exotic plants. Nitrogen saturation is occurring throughout high-elevation catchments of the Colorado Front Range. Data from Loch Vale indicates winter precipitation does not appear to be harmful at this time, but snowpacks accumulate up to seven months a year and melt off within a short period of time, causing a pulse of contaminants. Nitrogen saturation in forested ecosystems has been linked to serious environmental impacts, causing damage to foliage, premature needle drop, and decline in tree vigor (Williams et al., 1996).

Atmospheric deposition (acid rain or acid precipitation) occurs at RMNP, particularly during the summer months. The average pH measured from precipitation near Park Headquarters and also at Loch Vale is below 5.0 during the summer months, or below natural levels (Keigley and Porter 1986, Baron, 1991). The effects of acid rain on resources in RMNP including air quality, wildlife, water quality, vegetation, and the ecosystem are being studied, and are varied and complex (Fish and Wildlife Service 1982).

3.2.6 Cultural Resources

Archeological Resources

To date, of the 265,769.14 acres (451 square miles) in RMNP, only about 10 square miles has been surveyed for prehistoric or historic archeological sites. Over 500 prehistoric and historic archeological sites have been recorded as of the summer of 2000. However, few have been tested or evaluated for the National Register of Historic Places and the understanding of RMNP's prehistory is only known from small and incomplete surface collections.

Present evidence indicates that RMNP and the surrounding area was utilized for hunting and gathering activities over a period of about 10,000 years. Current information suggests that occupations were mostly in the summer and fall of the year. Of the archeological sites that have been recorded to date, most are campsites and isolated finds, but game drives and probable vision-quest sites are known. Other site types include isolated hearths, cairns, trails, culturally peeled trees, and collapsed wickiups. It is estimated that RMNP is likely to contain several thousand sites of all types.

Excavation has only been conducted on three sites in RMNP, and from less than a dozen sites in the mountains outside the Park. Such excavations are important for management and interpretation and provide necessary knowledge about the high-altitude prehistoric occupations for all time periods in RMNP.

Ethnographic Resources

Ethnographic data for this area is not well documented and little is known about cultures that were in the area prior to Euroamerican settlement beginning in 1860. The first settlers entering the area in 1860 made no mention of Native American activities. The Ute are suspected as having been the original inhabitants of the area, and may have been in the mountains for at least 6,000 years. Culturally peeled trees and the remains of collapsed wickiups have been recorded and suggest historic Ute occupations to possibly as late as 1890. A report of a pack trip through RMNP in 1914 with several Arapaho indicated that the area has been used on a continuing basis by the Arapaho from ca. 1790 to about 1860. The report of the trip also suggests that visitors may have included the Pawnee and Sioux. Recent research has indicated that people of Apache affiliation were in the Park, at least sporadically, beginning about AD 1500.

A continuing study involving contemporary Ute and Arapaho is being conducted with on-site visits and on-going consultation with tribal representatives. The study is designed such that confidential information will remain so. Information on Native American occupations is critical to managing the Native American Traditional Cultural Properties and sacred sites.

Historic Resources

Rocky Mountain National Park contains 146 historic structures which are eligible for listing or enrolled in the National Register of Historic Places (NRHP), 18 of these historic structures are presently identified within the backcountry or recommended wilderness. Other sites and remnants include glimpses of mining activities of prospectors, ranches of early homesteaders, rustic mountain lodges and hotels of entrepreneurs and buildings of the original park administration.

Several historic trans-mountain water diversion projects also exist within RMNP backcountry or recommended wilderness. One of the most significant is the Grand Ditch which runs for 14.3-mile on the east side of the Never Summer Range. The long ditch was begun in about 1895 and was completed in 1932. It crosses the Continental Divide and brings water from the west slope to the eastern plains. The Grand Ditch, Specimen Ditch, and the archeological remains of seven-associated ditch camps are National Register properties.

Cultural Landscapes

The McGraw Ranch is the only area in RMNP that has been documented as a cultural landscape. Part of the ranch is within recommended wilderness. Other areas within the backcountry and wilderness may be identified and considered for cultural landscape inventories in the future (e.g., Grand River Ditch, Fern Lake, Lawn Lake, North Fork, Thunder Lake Patrol Cabins and Reichhardt Property).

Historic Trails

Several trails, used by Native Americans, are known to have been in existence well before the turn of the century. The Ute (or Child's) Trail begins in Upper Beaver Meadows and extends over

Forest Canyon Pass to Beaver Creek north of the Timber Creek Campground. The Ute Trail roughly parallels Trail Ridge Road. The Deer Trail split from the Child's Trail at Poudre Lake and traversed Milner Pass to Deer Creek and the North Fork of the Colorado. The present Flat Top Trail incorporates most of the protohistoric Big Trail from Bierstadt Lake and over the divide and down into Big Meadows. The Dog Trail followed the Fall River. It is suspected that these, and many other trails, had their origin in prehistoric times.

3.2.7 Local Socioeconomics

Rocky Mountain National Park is one of the more popular tourist attractions in the State of Colorado. Based on the NPS Money Generation Model, about $206.7 million in revenue is generated each year from visitors, and about 4,135 people related to the tourist industry are employed in the counties surrounding RMNP including Boulder, Larimer and Grand counties. The average amount of money spent in the area is about $150 for 24 hours, or roughly $90 on lodging and $60 on food, retail, and other amenities.

Along the East Slope of the Front Range is the growing metropolitan area that extends from Cheyenne, Wyoming, on the north, to Pueblo, Colorado, on the south. There are about three million people living in this area, all within a relatively short driving distance to RMNP. The Town of Estes Park is the gateway community on the east side of RMNP and Grand Lake is the gateway community on the west side. The full-time population is 5,229 within the Estes Park town limits and 10,038 in the Estes Valley (including Estes Park). The full time population in Grand Lake is 500 and about 5,000 in the area between Grand Lake and Granby.

3.2.8 Visitor Use and Experience

Humans have visited the land within the boundaries of RMNP for over 11,000 years. The first visitors were in search of game and used game trails that lead over the Continental Divide. It was not until the mid-1800's that early explorers began to visit the Park, and it was not until the late 1800s when the area was first homesteaded. Visitors have been coming to the area for recreational purposes for over 100 years.

Visitation at RMNP has been increasing since 1915 when the Park was established. There were 13,000 visitors the first year RMNP opened. For the past decade, visitation has been increasing approximately two percent per year. Since 1994, visitation at RMNP has exceeded 3 million visitors a year. Overnight use in the backcountry has also been increasing. In 1984, a total of 6,536 backcountry permits were issued, in comparison to 8,344 permits in 1998, a 28 percent increase.

Visitor exit surveys were conducted in 1994 and 1995 to assess visitor demographics and visitor experience (RMNP 1994). Feedback from these surveys allows park managers to maintain key attractions, establish park guidelines, estimate visitor needs, and provide an overall positive experience for visitors. Results of these surveys indicate that:

- The average age of visitors is 46 years old;
- 40 percent of visitors live in the intermountain region of the U.S.;
- 38 percent of visitors are from Colorado;
- 36 percent of visitors are from the Front Range in Colorado;
- The average length of stay for day users is 2 hours and 45 minutes;
- The average length of stay for overnight users is 3.33 days;

- The scenery is the main attraction for 72.6 percent of respondents;
- Photography is another main attraction for 48.8 percent of respondents; and
- The most important features at RMNP are natural scenery, clean air, clean water, wildlife, tranquility, undeveloped vistas, alpine tundra, and night sky.

3.2.9 Park Operations

Because 95 percent of RMNP is recommended or designated wilderness, many park operations require access into or through wilderness areas. Activities in these areas range from construction, maintenance, and monitoring, to emergency rescue operations. Park operations that occur most frequently in wilderness areas and /or have the most potential to affect wilderness areas include:

- **Backcountry Permit System Administration** which includes issuing permits for backcountry use per standards set in this Plan.

- **Campsite Management** which involves the rehabilitation, maintenance, and monitoring of existing or new campsites.

- **Trails** which includes maintenance and monitoring of existing or new trails, bridges, and foot logs.

- **Climbing** which involves the maintenance and monitoring of climbing routes and bolt systems.

- **Research and Resource Monitoring** which includes natural and cultural resource and research projects.

- **Aircraft Use** which includes routine and non-routine flights. Routine flights include trail projects, fire monitoring, and wildlife surveys. Non-routine flights include emergency rescue operations and fire maintenance.

- **Emergency Rescue Operations** which requires vehicular support via motor vehicle or aircraft into wilderness areas.

- **Facilities Management** which involves limited maintenance or construction of facilities located within the wilderness boundaries, including waste or food management systems.

- **Wilderness Interpretation and Education Programs** which allow for groups to be escorted into wilderness areas by a RMNP staff member to learn about the natural and cultural resources found in wilderness areas and how to protect those resources.

Currently, decisions relating to park operations in wilderness are guided by the 1984 Backcountry Management Plan, plus policies and guidelines that are not formalized, but generally followed. Larger projects requiring senior management approval undergo Minimum Requirement analysis, but other actions may occur without this review and approval, since there are no written standards for this process.